SHORT REPORT

Asthma admissions and weather conditions in Costa Rica

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Abstract

In Costa Rica there is little information about asthma admissions. In this report the monthly asthma admissions and weather data for a seven year period were reviewed. The hospital asthma admissions showed notable seasonal variation associated with variations in the rainfall and the relative humidity.

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Keywords: asthma; hospitalisation; weather

Living organisms are affected by conditions prevailing in the environment around them; their adaptation to these conditions forms the basis of homeostasis.¹ A significant amount of work has been undertaken on the relation between weather and health.² Parents often attribute asthma attacks to a change in the weather. Weather can influence pollen release, mould presence in the atmosphere, and pollution. There is also evidence that weather conditions can directly influence asthma.³ In Costa Rica, a small Third World Latin American country, there is little statistical documentation on the epidemiology of asthma.

Materials and methods

The patient hospital admissions for asthma were reviewed from “Documentos Médicos y Estadística”, which provides 100% coverage for the National Children’s Hospital in San José, Costa Rica, the only third level paediatric hospital in the country. Each hospital admission event represents one continuous stay in

Table 1 Correlation coefficients between asthma admissions and percentage of relative humidity, minimum and maximum temperatures, and amount of rainfall

	Correlation coefficient (<i>r</i>)	<i>p</i> value
Relative humidity	0.655	<0.01
Minimum temperature	0.205	NS*
Maximum temperature	−0.045	NS*
Rainfall	0.633	<0.01

**p* ≥ 0.05.

hospital by one person. Thus one child may contribute more than one such event per month. All patients were less than 15 years old. Monthly asthma admissions and monthly number of non-surgical admissions for a seven year period (1 January 1992 to 31 December 1998) were reviewed. The average percentage variation of the total number of non-surgical admissions to the National Children’s Hospital and that for asthma were calculated. The trends were evaluated by the ratio to moving average method.⁴ Weather data are collected at the “Instituto Meteorológico Nacional”, which is located within five miles of the National Children’s Hospital. Maximum and minimum temperature, percentage of relative humidity, and amount of rainfall were obtained on a monthly basis for the period of study. The correlation between weather data and the average percentage variation of the total number of asthmatic patients admitted to the hospital was investigated. The Pearson product moment correlation coefficient (*r*) was used with 0.05 as the level of significance.

Results

The monthly admissions for asthma showed notable seasonal variations (fig 1), with peaks in March and August. The average percentage variation of admissions was significantly related to the relative humidity and the amount of rainfall (table 1).

Discussion

Asthma admissions in children in San José, Costa Rica, showed notable seasonal variation. A similar pattern of asthma admissions seasonality has been described in Japan, Australia, England and Wales, Canada, and the United States.³ The relative humidity and the amount of rainfall in San José during the seven year period appear to be related to the monthly admissions for acute asthma. The fact that

Figure 1 Seasonality of all non-surgical admissions and asthma admissions.

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people spend much more time together inside buildings during excessive rains probably increases the ability of viruses and bacteria to spread from one host to another. Furthermore, when indoors, the children are exposed to a variety of asthma triggers, including animals, dust mites, and chemicals. The admission rate pattern, consistent with a largely viral aetiology throughout the year, may be disrupted by school holidays, followed by at least two major peaks during the subsequent terms⁵; in our country, school holidays end in February and July, just before the two peaks of asthma admissions. There is also evidence that classroom activities may influence stress responses in young children.⁶ Furthermore, the exacerbations of symptoms could be caused by allergic conditions; for example, airborne pollen, mould levels, and number of house dust mites can vary greatly depending on the weather itself. With high relative humidity, it is

relatively easy to develop a severe mould and mildew problem, especially in closed-in areas; air quality data from Costa Rica is not, however, available. Thus, it is now mandatory to identify the factors that fluctuate together with seasonal variations in the incidence of asthma attacks in Costa Rica.

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